



Minnesota Renewable Energy Society

connecting minnesotans with renewable energy resources

The Solar Flare

e-Bulletin from the Minnesota Renewable Energy Society

September 2009

Highlights - (See details in following pages)

- Electric/Plug-in Hybrid Cars and Renewable Energy: A Critical Marriage - Friday, Oct. 2nd - p.4
- Minnesota Solar Tour – Saturday, October 3rd - p. 5
- Solar and Wind Energy Courses at Century College - beginning Oct. 10th - pp. 6 - 8
- Introduction to Renewable Energy Options and Opportunities - Nov. 18 - p. 8
- MN organizations collaborate to deliver clean, sustainable, and affordable transport - pp. 11-12
- The Eclectic Ensemble Plays Real Good for *Free* via Solar - p. 14
- Solar Energy History - pp. 18 -19
- Passive House Design, Effective Renewable Energy Use - pp. 20 - 22
- MRES Hosts Green Drinks - Oct. 14 to Jan. 13 - p. 23

Upcoming Events

September 2009 Member & Board Meeting

Thursday, September 10, 2009

5:30 PM – Networking and Pizza - Note new Time!

6:00 PM – Expert Guest Speaker

7:00 PM – Board Meeting

Location: Flannery Construction

[1375 St. Anthony Avenue, St. Paul, MN](#)



The Passive House design approach integrates multiple strategies to significantly reduce the consumption of energy used in buildings. At the September 10th meeting, we'll hear Joe Gransee-Bowman share his knowledge and experiences about the Passive House design approach and how its high performance building standards merge well with solar thermal and electric systems. The Passive House certification process can reduce building heating and cooling loads by up to 90%, and electrical needs by up to 70%, compared to conventional construction. In this presentation Joe will be introduced to the strategies of the Passive House approach and how the building and renewable energy industry can benefit from utilizing this integrated design approach. If you missed this presentation, check the MRES website for the video about a week after the meeting date.

Joe will complete his M.S. in the Sustainable Design in Architecture program at the University of Minnesota this Fall. He focused on Sustainable Community Development, and how we can integrate systems to provide a quality of life, going beyond just meeting our needs for food, shelter and energy. He participated in the inception of the Solar Decathlon project at the U of MN. He recently completed the Passive House Consultant training, but Joe does not represent [PHIUS](#). He has been active as an MRES member, helping develop the [Renewable Energy and Architecture](#) case studies on the MRES website, and coordinated the past guided Solar Tour for Architects and Engineers. Joe has been involved with renewable energy and sustainable design promotion and education for the last decade.

Harvest Festival & Energy Fair

September 12, 2009
9 a.m. until 4 p.m.
Bayfront Festival Park
Duluth, Minnesota



This September the Lake Superior Sustainable Farming Association and Lake Superior Energy Association will once again host the celebrated Harvest Festival & Energy Fair on Saturday, September 12, 2009 (rain or shine) from 9 a.m. until 4 p.m. at Duluth's Bayfront Park.

The 2009 Harvest Festival & Energy Fair is a one-day outdoor event that attracts thousands of families and visitors to Duluth to feast on locally produced food, stock-up on fresh produce and other homegrown goods at the farmer's market, learn about the latest renewable and clean energy technologies and initiatives, watch demonstrations by crafters and environmental innovators, buy locally produced arts and crafts, enjoy wonderful kids activities, listen to live music, and participate in a community local foods picnic.

This year marks the Energy Fair's 5th Anniversary and we hope you will once again join us in presenting this growing event to the greater Twin Ports community.

<http://www.lakesuperiorenergy.org/energy-fair>

RE fest

September 19, 2009
10:30 a.m. to 6:30 p.m.
Riverland Community College
1900 8th Ave. NW
Austin, MN

FEATURES:

- Raptor Show
- Eco-Friendly Auto Show
- RE•fashion Show
- Teens Go Green
- Storytelling
- Artisans & Food Vendors
- Over 50 Workshops & Exhibitors
- Solar Stage Musicians & Performers
- Keynote Speaker: J. Drake Hamilton:
"Getting to a Clean Energy Economy"



FOR THE KIDS:

- Earth Walk
- Solar S'Mores
- Family Canoe Fun
- Interactive Earth Balloon
- Wind Turbine Experiments
- Kid-Friendly Workshops & Movies



CLOSING CONCERT • 4:30-6:30pm
Stick around for the closing concert featuring...
after school special
www.myspace.com/afterschoolspecialmn



More information at: www.re-fest.org

Energy Expo 2009

Anoka, Minnesota

Anoka County Fair ground on Friday

Friday, September 25 - 4 p.m. to 9 p.m.

Saturday, Sept. 26 - 9 a.m. to 5p.m.



Energy Fair Features:

- Solar, Wind Energy
- Geothermal
- Air Conditioning
- Biodiesel
- High Mileage Vehicles
- Home Insulation
- Heating
- Windows
- Drapes
- Landscaping
- State Agencies
- Educational Institutions

www.northlandexpo.com
(763)227-9104

Entry Level Solar PV NABCEP - COK Exam course

St. Paul College - Training Center

317 Marshall Ave. St. Paul, MN 55102

September 21 - 26 & 28

8:00 a.m. to 4:30 p.m.



St. Paul College Customized Training & Continuing Education is offering a seven day course on solar photovoltaics (PV) with a [NABCEP Certificate of Knowledge](#) (COK) exam on the last day of the course.

Ten (10) essential skill-sets will be taught:

- PV Markets and Applications
- Safety Basics
- Electricity Basics
- Solar Energy Fundamentals
- PV Module Fundamentals
- System Components
- PV System Sizing
- PV System Electrical Design
- PV System Mechanical Design
- Performance Analysis and Troubleshooting

More information is available on the St. Paul College Customized Training & Continuing Education website: <http://www.saintpaul.edu/ContinuingEducation/Pages/SolarTech.aspx>

For more information contact: Dave Baker at 651-846-1583 (Direct)

AWEA Wind Resource & Project Energy Assessment Workshop

American Wind Energy Association

September 30 – October 1, 2009

Minneapolis, Minnesota



The AWEA Wind Resource & Project Energy Assessment Workshop is structured as an intermediate to advanced level program bringing together industry experts to explore and discuss cutting edge techniques and tools thereby advancing resource assessment as the wind energy industry continues to develop. Visit the AWEA event website for more information: <http://www.awea.org/events/wra09/>

New to wind resource assessment? Attend the pre-conference seminar: Resource Assessment 101 designed especially for those workshop attendees that are new to the industry or looking for necessary background information that will allow them to follow the technical nature of the full workshop. The pre-conference seminar can be added on in the conference registration process.

Electric/Plug-in Hybrid Cars and Renewable Energy: A Critical Marriage

Friday, October 2, 2009

University of Minnesota - Minneapolis Campus

5 p.m. - Electric Vehicle Show - on Church Street

7 p.m. - Panel Discussion - Rapson Hall Auditorium

This two-hour program will feature a speech by Marc Geller -- co-founder of Plug In America, and a California solar installer -- followed by a panel discussion including Geller, Minnesota legislators Sen. Scott Dibble, Fresh Energy Executive Director Michael Noble, and a Eric Jensen from Isaak Walton League. The evening is part of MRES' 30th-Anniversary-Year celebrations, and will be moderated by author/activist and MRES boardmember Christopher Childs.

The speech and panel discussion will address the vital importance of wedding renewable energy -- including wind power and solar power -- to an ever-expanding fleet of electric vehicles (EVs) and plug-in hybrid vehicles (PHEVs). In order to address climate change, oil-related security issues, the onset of peak oil, fuel-cost issues, and a host of vehicle-based pollution concerns, electricity from renewables now logically becomes the necessary resource to power our cars; the offset to gasoline costs offered by a home solar photovoltaic (PV) system can slash the payback time for PV to as little as five years. Related issues -- such as the need to pass a low-carbon fuel standard as a major tool to combat global warming -- will also be discussed, followed by an audience/panel question-and-answer session. The event is open to the public.

The event takes place literally on the eve of the annual American Solar Energy Society Solar Tour, whose Minnesota leg is organized by MRES; it will be sponsored by The Electric Vehicle Store, and there will be a display of electric and hybrid vehicles outside Rapson Hall on Church Street beforehand at 5:00 p.m.



The Electric Vehicle Store
Event Sponsor



MILES all electric truck



Luke Olson and Jukka Kukkonen with Wheego Whip EV

Minnesota Solar Tour - October 3, 2009

10 a.m. to 5 p.m.

MRES will host the 14th annual American Solar Energy Society's [National Solar Tour](#) in Minnesota on Saturday, October 3. The Minnesota Solar Tour had more than 50 solar homes and commercial buildings and over 2000 visitors attend it last fall.

If you have installed a solar electric, solar hot water, passive or active solar hot air, ground-source heat, and/or wind energy system at your home or business and would like to have your site in the Solar Tour, we invite you to apply to be a site. We are now accepting [Solar Tour site applications](#) on the MRES website.

We expect an even bigger turn out this year, and we need volunteers again to help conduct the event.

Please contact Doug Shoemaker at (612) 308-4757 or DougS@mnRenewables.org to work as a volunteer at the event. See more information about the event is at: www.MNSolarTour.org



Solar Energy: Everything You Always Wanted to Know About Photovoltaics

Saturday: October 10, 2009

Century College

3300 Century Avenue N.

White Bear Lake, MN

Phone: (651) 779-3341

9 a.m. to 3:45 p.m.

Room: Century East Campus 2313



Century College and the Minnesota Renewable Energy Society have co-developed, this one-day introductory course for homeowners and people interested in learning the basics of how to design a solar photovoltaic (PV) system for residential applications.

The essentials of creating electricity from sunlight are covered. You will learn to evaluate solar site resource, when solar PV is the right solution, the economics and incentives for solar PV, and system design principles. System components, system sizing, PV panels, inverters, grid connected vs. non-grid connected systems, electrical connections, will be all explored. \$10 discount for MRES members.

Ralph Jacobson, a 25 year veteran of solar system installations, is the course instructor. He is a materials engineer, NABCEP certified in both solar PV and solar thermal installation. Ralph is currently involved developing a strategy for growing the solar industry in Minnesota and developing training programs for the building trades. He is also on the Board of Directors of the Minnesota Renewable Energy Society and the owner of [Innovative Power Systems](#).

Class **registration** and information on the [MRES classes and workshops](#) webpage.

Course ID: 001722

Solar Energy: Everything You Always Wanted to Know About Solar Water Heating

Saturday: October 24, 2009

Century College

3300 Century Avenue N.

White Bear Lake, MN

Phone: (651) 779-3341

9 a.m. to 3:45 p.m.

Room: Century East Campus 2313



Century College and the Minnesota Renewable Energy Society have co-developed, this one-day introductory course for homeowners and people interested in learning the basics of how to design a solar hot water heating system for residential applications. \$10 discount for MRES members.

The essentials of creating domestic hot water from the solar radiation are covered. You will learn to evaluate solar site resource, when solar hot water is the right solution, the economics and incentives for solar hot water, and system design principles. System components, system sizing, solar thermal panels, storage tanks, heat exchangers, and plumbing connections, will be all explored.

Ralph Jacobson, a 25 year veteran of solar system installations, is the course instructor. He is a materials engineer, NABCEP certified in both solar PV and solar thermal installation. Ralph is currently involved developing a strategy for growing the solar industry in Minnesota and developing training programs for the building trades. He is also on the Board of Directors of the Minnesota Renewable Energy Society and the owner of [Innovative Power Systems](#).

Class **registration** and information on the [MRES classes and workshops](#) webpage.

Course ID: 001723

Wind Energy Site Assessor Class

Century College

October 26 -29, 2009



The Century College is offering the Wind Site Assessor Training workshop in partnership with the Minnesota Renewable Energy Society and the Midwest Renewable Energy Association.

This Wind Site Assessor Training workshop will help participants learn how to evaluate a site's wind energy potential, determine wind speeds at proposed heights, make a load profile for a client's energy needs, determine appropriate tower heights and estimate energy output for a system based upon wind resources.

Mick Sagrillo, the instructor, has over 20 years experience with wind technology and installation. He has been involved in over 700 projects in 46 U.S. states and 29 foreign countries. He is also an author of many articles published on small-scale wind technology. Sagrillo is the wind editor and a regular contributor of wind power articles to Home Power Magazine; monthly columnist for the American Wind Energy Association's Windletter; he's a columnist for Solar Today magazine and has written various articles on wind power for PV/Wind Energy News and Backwoods Home magazine. Sagrillo is a founding member of the Midwest Renewable Energy Association and has served as president of the board since 1991. He is currently the owner of Sagrillo Power and Light, a consulting firm specializing in home-sized wind turbine technology and educational workshops.

Class information on the [MRES classes and workshops](#) webpage.

Go Green Expo

Business-to-Business Expo

Friday, November 6th • 10am - 5pm

Business-to-Business & Business-to-Consumer Expo

Saturday, November 7th • 10am - 6pm

Sunday, November 8th • 10am - 5pm



Minneapolis Convention Center

1301 Second Avenue South

Minneapolis, Minnesota 55403

(612) 335-6000

www.minneapolisconventioncenter.com

Tickets:

Friday: Complimentary to Business Buyers

(please bring your business card for admission)

Saturday & Sunday: \$10 for a full weekend pass

\$5 for Students & Seniors with proper ID; Children 12 and under are Free

Careers in Renewable Energy

Saturday, November 7, 2009

Century College, 3300 Century Avenue N.

White Bear Lake, MN

Phone: (651) 779-3341

8:00 a.m.–12:00 p.m.

East Campus, Room 2313



Century College and the Minnesota Renewable Energy Society have co-developed a new half-day course for people interested in exploring renewable energy careers.

One of the most common questions people ask about renewable energy is “How can I be involved in this rapidly expanding field?” Find out the answer to this question and a multitude of others in this 4-hour session. Careers involving solar and wind site assessment, design of systems, installation of systems, and many other aspects of solar PV, solar thermal, and wind power applications will be discussed. \$10 discount for MRES members.

Ralph Jacobson, a 25-year veteran of renewable energy system installations and owner of IPS (Innovative Power Systems), one of this area’s largest solar installers, is the course instructor. He is a materials engineer, NABCEP certified in both solar PV and solar thermal installation. Ralph is currently involved in developing strategies for growing the solar industry in Minnesota and developing training programs for the building trades. He is also on the Board of Directors of the Minnesota Renewable Energy Society.

Class **registration** and information on the [MRES classes and workshops](#) webpage. Century College website. Course ID: 001725.

Introduction to Renewable Energy Options & Opportunities

Saturday, Nov. 14, 2009, 8:30 AM to 5:00 PM (8:00 a.m. check-in)

Location: Flannery Construction, 1375 St. Anthony Avenue, St. Paul, MN

MRES offers Introduction to Renewable Energy (RE) Options & Opportunities: the course includes technology alternatives and options, including Solar PV (solar electric), Solar Hot Water & Space Heating, Passive Solar Hot Air Heating, Wind Energy, Energy Efficiency, RE environmental issues, RE costs, rebates & incentives, finance options, and RE career opportunities.



- Learn about energy efficiency and why it is important.
- Learn how RE impacts the environment.
- Learn basics about RE technologies and options, including solar PV (electric), solar hot water and space heating, passive solar and active solar hot air heating, and wind energy systems.
- Learn about RE costs; environmental issues; rebates, incentives, and financing options; and RE resources.
- Learn about RE installations in Minnesota: lessons learned and success stories.

This MRES class is intended for homeowners, community leaders, business owners, green and RE career seekers, people interested in RE, and the general public (intended for age 18 and over). Don’t wait too long to register; this class has been very popular and has filled well before it begins.

Class information on the [MRES classes and workshops](#) webpage.
\$55 MRES members; \$80 non-members

E3: The Midwest's Premier Energy, Economic and Environmental Conference

Tuesday, November 17 at the St. Paul River Centre



How do we provide sustainable fuel, food, fiber and fresh water to a global population of 9 billion people in our lifetime? That's one of the critical issues we'll explore during E3 2009. New this year, the conference features a lunchtime panel discussion with national experts, track sessions focused on the big questions of the 21st century, and a series of "Green on the Ground" workshops.

Hosted annually by the University of Minnesota's Initiative for Renewable Energy and the Environment, a signature program of the Institute on the Environment, the E3 conference showcases current technologies, environmental benefits and market opportunities in renewable energy. Each November, scientists, movers and shakers, and policymakers from across the Midwest and beyond join together to share knowledge and discoveries.

Student Registration \$20

Early bird rates available through Friday, October 16, 2009.

UMN Faculty and Staff: \$60

External: \$80

Regular registration prices available October 17 - November 13, 2009

UMN Faculty and Staff: \$80

External: \$100



Onsite Registration November 17, 2009

UMN Faculty and Staff: \$90

External: \$110

More information and registration: www.iree.umn.edu/e3

SOLAR THERMAL '09

National Solar Heating & Cooling Conference
DECEMBER 3rd & 4th, 2009
Madison, Wisconsin
Monona Terrace



SOLAR THERMAL '09 is a national conference and expo for the solar thermal professional. The Midwest Renewable Energy Association (MREA) invites you to the only professional level conference devoted to solar heating and cooling. It is the only professional level Solar Thermal Conference of its kind in the nation.

Installers, manufacturers, site assessors, dealers, distributors, state agency representatives, and policy makers will not want to miss this one-of-a-kind conference.

The MREA is currently calling for presenters, exhibitors and sponsors for the conference. Please visit <http://www.the-mrea.org/shwconference.php> for more information and to register for the conference. If you have any questions, please contact Kirsten at 715-592-6595.

CONFERENCE TOPICS INCLUDE:

- Solar hot water, solar hot air, and solar space heating sessions
- Manufacturer and dealer updates
- Best practices on residential and commercial applications
- New control and balance of system options
- Structural considerations
- State policy and incentive updates

REGISTRATION EXHIBITOR & SPONSORSHIP DETAILS

Register online, Paypal, Visa, and Mastercard accepted. If you cannot register online, contact the MREA at 715-592-6595 or www.the-mrea.org. You can also register at the REI here in Custer.

Whether you are new to the solar thermal industry or an experienced veteran, this conference will show you how to tap into the growing demand for solar water heating systems - and greatly expand the success of your business.

Supporting the Solar Thermal Conference

Interested in supporting the 2009 Solar Thermal Conference? Click [HERE](#) for a list of sponsorship opportunities. We are not limited to these opportunities so if you are interested in discussing other unique opportunities please contact Kirsten at kirsten@the-mrea.org.

Show off your company and connect with professionals from around the country. A limited number of exhibit spaces are available for the conference \$500 for 10 x 10. All exhibitors must also register for the conference. Contact Kirsten Olson at 715-592-6595 or kirsten@the-mrea.org with exhibitor questions.

Minnesota organizations collaborate to deliver clean, sustainable, and affordable transportation at the Great Minnesota Get-Together

SAINT PAUL, Minn. – Sept. 7, 2009 – At the Minnesota State Fair this week, four local organizations got it together to deliver a public service message about affordable, clean and sustainable transportation.

“When you use solar photovoltaic (PV) technology to generate electricity that offsets \$2.50/gallon gasoline used to run an internal combustion vehicle, and instead charge the battery of an electric vehicle with the PV system, you are not only using renewable and sustainable energy to do it, the savings from using sunshine to power your vehicle will pay for the PV system in as little as five years,” said Rebecca Lundberg, CEO of Powerfully Green, a local renewable energy installer.

Lundberg has spent the last twelve days at the Minnesota State Fair communicating this message in the net zero energy home she helped construct in the Eco Experience Building. The zero energy house has 7.48 kilowatts of solar electric PV panels installed on it, generating enough energy to heat, cool, and power the dwelling all year, with a net zero use of fossil fuels.

“There are so many good technology options available in electric vehicles on the market now. We are living in exciting times. New technologies are bringing electric vehicles to the roads and the vehicle markets as we know them are going through a lot of change,” said Jukka Kukkonen, Chief Technical Officer of The Electric Vehicle Store. “Electric cars and trucks, in addition to providing us clean and sustainable transportation, can also help us to build new energy solutions when used with solar energy PV systems,” said Kukkonen.

The Minnesota Renewable Energy Society (MRES) exhibited its Solar Trailer at the Eco Experience Building at the Minnesota State Fair by charging a MILES ZX40ST electric truck with electricity generated from Minnesota sunshine.

The electric charge on the MILES truck comes from the 1.6 kilowatt solar PV array on the MRES solar trailer. The Electric Vehicle Store loaned the MILES electric truck for exhibition and demonstration to show how solar energy can be used efficiently in transpiration applications.

“Electric vehicles are creating a tremendous opportunity to bring solar energy into transportation in Minnesota, because you can use any electricity to charge the vehicle. However, solar energy has an important role in the Minnesota energy mix,” said Ralph Jacobson, an MRES Board member and CEO of Innovative Power Systems. “If we allocate energy sources to their highest best use, we can achieve both economic and environmental security by combining solar energy in intelligent transportation applications,” said Jacobson. MRES hosted the solar exhibit for the Eco Experience at the Minnesota State Fair, and demonstrating the electric vehicle application with solar PV charging at their Solar Trailer just outside the entrance to the building.

Combining solar energy with electric vehicles creates a symbiotic relationship between the economy and the environment for positive social change. MRES is celebrating its 30th Anniversary with a series of events. On October 2, MRES will host a presentation and panel discussion with an electric vehicle and solar exhibition at the Rapson Hall Auditorium at the University of Minnesota. The event takes place literally on the eve of the annual American Solar Energy Society (ASES) National Solar Tour, whose Minnesota leg is organized by MRES. The October 2nd event will be sponsored by The Electric Vehicle Store, and there will be a display of electric and hybrid vehicles outside Rapson Hall on Church Street beforehand at 5:00 p.m. For more information go to: www.mnRenewables.org or www.mnSolarTour.org

(Continued on page 12: Minnesota organizations collaborate at Fair)

Minnesota organizations collaborate at Fair (Continued from page11)

Powerfully Green offers complete design and installation packages for both solar electric and solar thermal systems. Rebecca Lundberg, CEO of Powerfully Green, is a NABCEP certified Solar PV installer and licensed Minnesota Residential Building Contractor. For more information visit: www.powerfullygreen.com

The Electric Vehicle Store offers a variety of zero emission plug-in electric vehicles for practical solutions for everyday commuting and transportation needs. The Electric Vehicle Store spun-off to specialize in plug-in zero emission electric transportation products and services. For more information visit: www.theelectricvehiclestore.com

Innovative Power Systems (IPS) is a licensed general and electrical contractor and designs, installs, and services solar electric, solar thermal, and large residential wind systems. IPS has been in business since 1991 and has installed hundreds of systems throughout the Upper Midwest. Ralph Jacobson is the CEO of IPS and one of the most experienced solar and wind energy installers in the state of Minnesota and NABCEP certified for both solar electric and solar thermal systems. For more information visit: www.ips-solar.com

The Minnesota Renewable Energy Society (MRES) is a member-run, 501(c)(3) non-profit organization incorporated in Minnesota in 1979 to promote the use of, and to engage in advocacy for, renewable energies in Minnesota through education and through the demonstration of practical applications. MRES is involved in education, awareness, and advocacy efforts for all forms of renewable energy, with a particular emphasis on solar technologies. The mission of MRES is to advance a sustainable society and a renewable energy economy through education, leadership, and example. The organization's vision is to be a key catalyst in advancing solar energy and in transforming Minnesota's energy landscape to embrace efficiency and sustainability. Above all else, MRES values: planning for the long term in order to preserve the commons for future generations; equitable access to renewable energy for all; effecting change through education and example; embodying excellence and positivity, honesty, science, and truth. And...perseverance. MRES is celebrating it's 30th anniversary this year. For more information visit: www.mnRenewables.org



Ralph Jacobson at Solar Charging Station talking about *Solar* as visitors' cell phones get a solar energy charge

Record Crowds show-up at Eco Experience

MRES staffed the Solar Exhibit at the Eco Experience during the Minnesota State Fair. State Fair officials reported record attendance of 1,790,497 people attending the Fair between Aug 27 to Sept 7.



The Eclectic Ensemble Plays Real Good for Free at Eco Experience via Solar

SAINT PAUL, Minn. – Sept. 7, 2009 – Charlie Henrikson and Tim Donahue arrived at Minnesota State Fair grounds early in the evenings and set-up outside the Eco Experience building by the MRES Solar Trailer. They played for free to the public passing by until dark when they packed up and rode off into the night on their bicycles pulling their equipment they'd packed in their bike trailers.



Charlie Henrikson on violin and Tim Donahue on percussion

Music Of The Sun (M.O.T.S.) is a solar powered mobile music project of The Eclectic Ensemble, which is currently a duet performed by Charlie on guitar, violin, and effects and Tim on bass, Vincent, loops, and sound effects. They use a Sun Wise 60 watt solar PV panel, a Blue Sky Solar Boost 2000E controller, a Concorde 12V AGM battery, and a Samlex 600W pure sine wave inverter to power their system. The duo gets anywhere from 60 to 120 minutes of performing time with their system, depending on solar conditions. The solar rig, loudspeaker system, and instruments are transported by two large custom-built bicycle trailers, which are biked on trails and to parks of Minneapolis and St. Paul. They have been playing for free as the M.O.T.S. project.

“Charlie and I have been performing together since 1998 working towards what we have now, artistic freedom and greater purpose for our music. We perform in the places that compliment our music and inspire us, such as bike trails, beside a lake, or in a grove of trees. With our artistic freedom, we have purpose for our music that goes beyond art. By using solar power, bicycles, and 100% post-consumer materials for our road cases and business cards we are setting an example. M.O.T.S is a positive and tangible demonstration of change people can and are making right now,” said Donahue.

The duo works from the “controlled improv” sphere. Key, rhythmic feel, and mood are called out during performance and guide the music on a surreal reflection of the environment in which the ensemble performs. A key aspect of the Eclectic Ensemble’s sound is the real time looping and effects processing the two have been refining over the past eleven years. Audio sources are sent to an on-stage mixer from which stereo imaging, routing through effects chains, and volume are controlled. Performance typically focuses on being a part of an event or environment vs. being the focus. Using ambient aspects such as weather, the nature of an event, or the dynamics of ambient room conversation to guide our music, situates them in a key yet subtle position. Check them out at: www.theeclecticensemble.com

Utility SPI Scholarships

SEPA still has a few remaining utility scholarships to attend Solar Power International in October:

The [Solar Electric Power Association](#) (SEPA) is pleased to offer a limited number of scholarships for Utility Executives to attend [Solar Power International](#) in Anaheim, CA, October 27-29th.

The scholarships are intended to encourage attendance of utility staff who would not otherwise be able to participate due to budgetary and/or travel restrictions. Municipal, cooperative, investor-owned, and utility association staff are all eligible to apply.

Geographic location, utility-type, and SEPA membership status will be considered to ensure a diversity of recipients.

Scholarship Details and Terms:

- Scholarship recipients will receive complimentary full conference registration, and up to \$1,000 stipend for coach airfare and hotel stay (receipts reimbursed); only one scholarship is available per utility and is available only to utilities
- Applicants must be at a management level or above.
- Individuals representing utilities that are not currently SEPA members must agree to consider SEPA membership and schedule one conference call between relevant utility staff and SEPA staff within 90 days following the conference to discuss the utility's solar activity plans and potential SEPA membership.
- Applicants will be notified no later than September 15, 2009 if they have been selected to receive a scholarship.
- Recipients must attend two SEPA events held in conjunction with Solar Power International 2009; SEPA's Membership luncheon on Tuesday, Oct. 27th and the Utility Networking Reception on Wednesday, Oct. 28th.

Apply for a 2009 SEPA Utility Scholarship here: www.regonline.com/63380_743714J

PUC SPI Scholarships

Solar Power International similarly has a limited number of scholarships available for Public Utility Commissioners to attend Solar Power International. The scholarships are intended to encourage attendance of elected or appointed commissioners who would not otherwise be able to participate due to budgetary and/or travel restrictions.

Apply online a for PUC SPI scholarship: <http://www.regonline.com/Checkin.asp?EventId=736772>

For questions and more information contact:

Solar Electric Power Association

Mike Taylor | Director of Research and Education

P: 202-559-2028 | F: 888-730-8259

mtaylor@solarelectricpower.org | www.SolarElectricPower.org

MRES Trains more than 175 People in Wind Energy Classes

Due to increasing interest in renewable energy and residential-sized wind turbines, MRES put on several two and three three-day workshops to provide the community with an opportunity to learn the about small scale wind project development. Over 175 people were trained in small wind technology. The timeliness of this workshop complemented the growing demand and interest in renewable energy.

This three-day course led participants through all the necessary background information required to site and install a small wind turbine (up to 40 kW in capacity). The course covered in detail all the steps for a successful project including timelines, initial planning stages, siting considerations, wind resource assessments and energy production estimates, tower considerations, zoning requirements, interconnection, insurance, used equipment, permitting, equipment assembly, decommissioning, plus much more.

The expanded small wind class, led by Roy Butler and a volunteer team from JATC led participants through a two-day intensive hands-on workshop. The class received instruction installing a variety of small wind machines. One day was focused outdoors installing small wind turbines and one day on computer software modeling. As part of the course, participants received a copy of the Seventh Wind Performance Calculator software program.

With the passage of the Emergency Economic Stabilization Act of 2008 and the American Recovery and Reinvestment Act of 2009 came a small wind investment tax credit to help consumers purchase small wind for home, farm and business use. Owners of small wind systems with 100 kilowatts (kW) of capacity and less can receive a credit for 30% of the total installed cost of the system. The credit will be available for equipment installed through December 31, 2016.



Roy Butler - Wind Energy Instructor

Slice of Shoreview

Friday - Sunday, July 27 - 29

Island Lake Park

The Slice of Shoreview celebrated the City of Shoreview's historic 50 year milestone with a Back to the 50's trip down memory lane. The annual music, arts, food and entertainment festival has become the largest and most popular community get together with highlights including carnival rides, talent show, fireworks and parade. This year's Slice of Shoreview was bigger and better than ever with new features and events tied to the 50th Anniversary Celebration including a Movie in the Park night, special displays on the history of Shoreview, and invited parade honorees and dignitaries.

Visit: <http://www.sliceofshoreview.com/>

MRES had the Solar Trailer and a table top exhibit at the event.



The MRES Solar Trailer soaked up sun while the kids jumped for fun.

Solar Energy History

By Jan Hubbard

*We travel through time on a cyclical path often returning to where we came. Black Elk (1863-1950), a Lakota holy man, explained the symbolic power of the circle for his people in the book *Tipi: Home of the Nomadic Buffalo Hunters* (2007): “You have noticed that everything an Indian does is in a circle, and that is because the power of the world always works in circles, and everything tries to be round. In the old days when we were a strong and happy people, all our power came to us from the sacred hoop of the nation and so long as the hoop was unbroken the people flourished.... Everything the power of the world does is done in a circle... (p. 55).”*

The Earth is a system of interrelated entities and elements that form an organic whole. It is bounded by a near-perfectly balanced atmosphere encircling our world. As an open system, Earth interacts with its surroundings by circling the Sun while energy flows in and out of the atmosphere and around the planet. The atmospheric sphere bounding our world regulates the Earth's climate by absorbing and reflecting power from the Sun in heating and cooling cycles in day and night, by season, and through the ages. However, without the nearly perfect density and mixture of atmospheric gases in balance that surrounds our planet, this revolving circle of life becomes broken, and we would no longer flourish.

Even long before human times, the Earth has acted as a huge solar collector regulating its own temperature range by cyclical interaction with the Sun. Operating like the roof on a greenhouse, if the Earth's atmosphere were to become too dense, the temperature range we enjoy would increase to a disturbing extreme. Scientists and explorers have recently observed significant melting of glaciers and polar ice as significant evidence of climate change. In 2007, the United Nations' Intergovernmental Panel of Climate Change reported that it is 90% probable human activity is a significant cause of global warming. While some controversy over the cause of climate change remains, there is little dispute that global temperatures have been increasing since the beginning of the Industrial Revolution, and the temperature increase is correlated along with increasing fossil fuel burning and a steady increase of greenhouse gases in the Earth's atmosphere. As a result the interest in and use of alternative energy sources has increased significantly. However, uses of other energy sources and in particular, solar energy, has been utilized in some form by all of earth's inhabitants.

People often look for new ways of doing things, and it's amusing how “innovations” are often rediscoveries of our ancestors' ways. Ancient Greek, Chinese, and Anasazi people used solar energy for heating their living quarters. Socrates observed, “In houses that look toward the south, the sun penetrates the portico in winter.” People now use passive solar heating technology in ways that it had been used for heating human dwellings for over a thousand years.

Photosynthesis in ancient algae, bacteria, and flora converted sunlight and carbon dioxide into organic compounds, and some of it became oil, coal, or methane. Solar energy is stored in these “bio-batteries” in the form of fossil fuels. However, the natural process of storing solar energy in fossil fuel takes much too long for humans to consider as a renewable resource. Solar energy remains an important means to conserving our natural resources and our energy security.

To achieve long-term sustainability and balance in our environment with the use of technology, we need much quicker cycle times than thousands of millennia to transfer energy from the Sun through burning fossil fuels to meet our energy needs. The Sun beams the most essential and plentiful clean energy to us every day, and solar technology options using solar panels and passive solar construction uses energy directly from the Sun to heat our buildings as the ancient Greek, Chinese, and Anasazi people did. Thankfully, we also have newer options to generate electricity from sunlight.

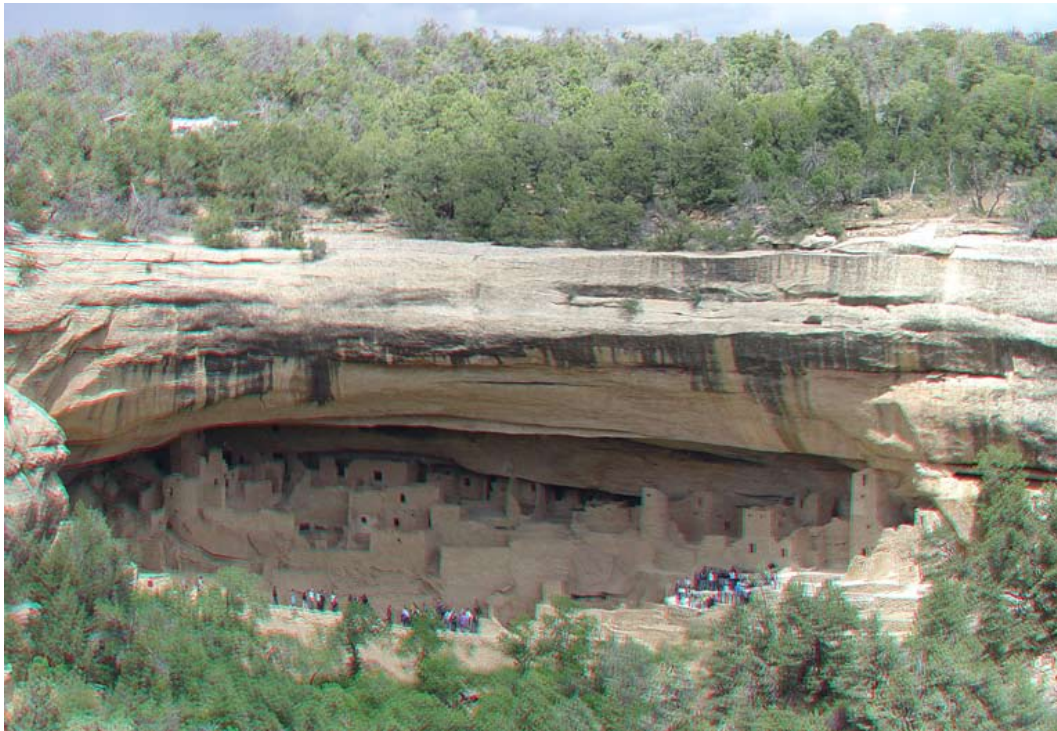
In 1839, a solar photovoltaic technology revolution emerged when French scientist Edmond Becquerel discovered the photovoltaic (PV) effect; he observed an electricity-generation increase when light was exposed to an electrolytic cell. In 1954, the first semiconductor PV cell was born in the United States when Daryl Chapin, Calvin Fuller, and Gerald Pearson developed the first silicon solar cell at Bell Telephone Laboratories, which was 4% efficient.

(Solar Energy History - Continued on page 19)

(Solar Energy History - Continued from page 18)

Today, monocrystalline silicon solar cells approach 20% efficiency, multijunction solar PV cells can reach 40% efficiency, and researchers are targeting 60% efficiency. Several other promising low cost solar PV technologies are also emerging, such as “thin film” Copper Indium Gallium Selenide (CIGS) and organic polymer solar PV paint. The U.S. Department of Energy predicts that within a few years, new solar PV technologies will be able to reach a system cost of only \$3 to \$4 per watt, which will produce energy at 8 to 10 cents per kilowatt-hour, like present conventional electricity generation costs.

The present day solar revolution leaves many people with passive solar heating options that served our ancestors, and researchers are developing new biological and chemical technologies to give us new ways to store and use solar energy for a better and cleaner way of life. Solar energy is an incredible and awesome power that sustains life on Earth, and life will continue to flourish on our planet while we remain in harmonic balance with our environment as our organic spaceship Earth rotates and circles around the Sun.



Mesa Verde cliff dwellings in Southwest Colorado, inhabited 600-1300 AD with Passive Solar design

RESOURCES ON THE WEB:

Minnesota Renewable Energy Society: www.mnrenewables.org/explore/links.php

Intergovernmental Panel of Climate Change: www.ipcc.ch

Climate Change: NASA's Eyes on the Earth: www.climate.nasa.gov

NOAA's Climate Program Office: www.climate.noaa.gov

GOOD SOLAR BOOKS;

Passive Solar House: The Complete Guide to Heating and Cooling Your Home,
by James Kachadorian, Chelsea Green Publishing Company, 2006

Build Your Own Solar Heating System, by Kenneth Clive, Minneapolis: Lucerna Publishing, 2007

Solar Water Heating: A Comprehensive Guide to Solar Water and Space Heating Systems,
by Bob Ramlow, New Society Publishers, 2006

Photovoltaics: Design and Installation Manual , by Solar Energy International, New Society Publishers, 2004

LOCAL SOLAR RESOURCES:

Minnesota Solar Energy Industry Association
Saint Paul, MN
651-646-2121
www.MnSEIA.org

Fresh Energy
St. Paul, MN
651-225-0878
www.fresh-energy.org

Minnesota Office of Energy Security
St. Paul, MN
651-296-5175 or 800-657-3710 (MN only)
www.Energy.mn.gov

www.mnRenewables.org

Passive House Design, Effective Renewable Energy Use

by Joe Gransee-Bowman

WHY PASSIVE HOUSES: SOLAR CAPITAL

In a time of climate change and peak oil production, Passive House design promises to help meet the challenges of the 21st Century. The Passive House certification process can reduce building heating and cooling loads by up to 90%, and electrical needs by up to 70%, compared to conventional construction. Indoor environmental quality is achieved with comfortable temperatures, fresh air ventilation, natural daylight, and attention to acoustics. These structures utilize passive solar gain to meet a sizeable portion of the energy demands in a passive way.

Passive House design effectively delivers comfortable conditions in buildings that are affordable, using integrated design strategies to significantly reduce energy consumption in buildings. At the same time, this approach begins to address the global environmental impacts of buildings. In the last decade, over 10,000 buildings have been constructed or retrofitted to meet the Passive House certification standards worldwide. In Europe, industry and innovation have honed these design approaches and systems to change the way buildings are conceived, operated and maintained.

INCEPTION OF PASSIVE HOUSES

Developed in response to the first oil embargo, passive solar and super-insulation designs in the U.S. influenced the evolution of the Passive House Certification process in Europe. Passive House design was pioneered in the U.S. with the efforts of Stephan Tanner, a Swiss architect, and Katrin Klingenberg, a German architect, who were working on different Passive House projects in Minnesota and Illinois, respectively. In 2006, they convened a Passive House Conference at the Waldsee BioHaus, (see reARCH Case Study www.mnrenewables.org/rearch) a project Tanner designed for the Concordia College German Language Village in Bemidji, MN. In 2007, Klingenberg along with Mike Kernagis, a U.S. Passive House builder started the Passive House Institute U.S. (PHIUS) in Urbana, IL where they had been working on Passive House projects. PHIUS was accredited by the German based Passive House Institute, and now provides Certification for Passive House consultants and projects across the U.S.

(Source: Homes for a Changing Climate – Passive Houses in the U.S.)

WHAT IS A PASSIVE HOUSE: STANDARDS AND STRATEGIES

The two main drivers of Passive House design are effective energy use and affordability. The two guiding principles are reducing emissions of carbon and other greenhouse gases through efficiency, while providing a comfortable, healthy indoor environment. The Certification standards require modeling of the building energy performance using the Passive House Planning Package (PHPP). The performance standards include:

- PHPP design for space heating and cooling energy needs must be 4.8 kBtu/sf/yr or less.
- PHPP design for primary overall energy consumption must be 38.1 kBtu/sf/yr or less.
- A blower door test confirms the building air tightness to be 0.6 ACH at 50 Pascal or below.

The integrated design strategies address the high performance standards influenced by the site's climate conditions. This eliminates the expensive traditional furnace and air conditioning system. Energy loss and condensation transferred by materials connecting the interior to the exterior is prevented by elimination of thermal bridges with careful insulation detailing. Solar heat is gained through high performance windows and doors on the building's south side. The airtight, super-insulated building envelope balanced with thermal mass for heat storage, keeps the internal spaces comfortable. For example, notice in the first two images the two feet thick wall and the slab on grade to store solar heat gained through the south side windows and glass door.

Overheating of the building is avoided by shading from overhangs (see photos) and other shading devices or from natural shading features of the site such as trees or arbors. Careful placement of windows allows for seasonal natural ventilation. In the third image the north and west sides of the building exemplify the minimized amount of windows, a north side porch shaded by the building and a generous overhang, as well as the compact shape of the house. The ventilation system provides 100% fresh air that is pre-conditioned as it enters the building. The heat or energy recovery ventilator exchanges the conditioning of the outgoing exhaust air before it leaves the building. The fourth image shows how the ventilation system fits in the closet. At this

(Passive House - continued on page 21)

(Passive House - continued from page 20)

stage, a solar thermal system for domestic hot water (note the collectors above the garage in the last image) could also be sized to provide auxiliary space heat. This would augment the solar heat gained from windows and doors. Backup for peak times in extreme climate conditions such as in Minnesota, can be met with mini-split heating/cooling units or point source units.

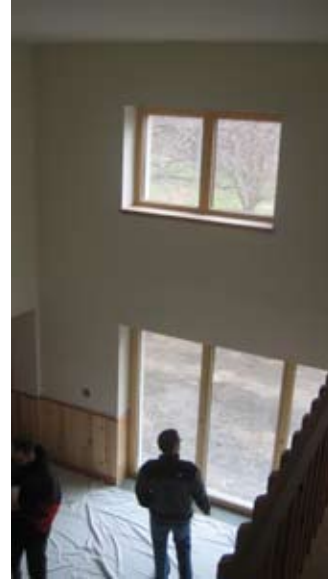


Image 1 and Image 2: Passive House in Urbana, IL: Large south side windows and glass door allow solar heat to be stored in the concrete floor, also notice the 2 feet thick super-insulated wall (Photo credit: Joe Gransee-Boman).



Image 3: Passive House in Urbana, IL: Notice the size and number of windows along the north and west sides, as well as the overhangs and north side porch, compact building shape and solar thermal system above the garage (Photo credit: Joe Gransee-Bowman).

Passive House: continued on page 22

Passive House: continued from page 21

The elimination of the traditional furnace and air conditioner offsets the cost of increased insulation and labor due to construction of the air tight envelope. The goal is to stay within 10% increase to costs associated with conventional construction in the area. The long term savings of energy efficiency will significantly reduce utility bills during the lifetime of the house. With energy efficient appliances incorporated, a solar electric system on a structure like this looks like a super hero. This improves the affordability for generating surplus energy as well as offsetting carbon emissions, beyond just meeting net-energy consumption. This means investment in renewable energy systems that are much smaller than a conventional structure would require.

Passive House certification can also be achieved in deep retrofit conditions. The applied strategies require creative solutions and a careful eye to keep costs benefit ratios of the upgrades compared to the original cost of the home and site in check. Retrofitting older buildings can be complicated with the potential presence of hazardous materials such as lead paint, asbestos, moisture and soil gas problems, as well as outdated space conditioning systems. Likewise, expensive newer houses tend to be super-sized, quickly built and lacking performance detailing, with difficult shapes to re-insulate. Mediocre quality components in expensive newer construction may be difficult to cost effectively replace with higher performance components. The final challenge is addressing the slabs or basements for moisture or soil gas penetration that can lead to window condensation or radon risk, as well as insulating to prevent energy loss.

RENEWABLES MERGING WITH BUILDING PERFORMANCE

Integrating these strategies can bring together the owner of the project with more than just an architect or builder. The dialogue is informed by the sharing of experience and concepts with engineers, building performance consultants, and other industry professionals such as renewable energy installers, HVAC contractors, electricians, plumbers, and other building contractors. Passive House design approach of high performance building standards merge well with renewable technologies, benefitting the building and renewable energy industries while addressing the lower energy needs of the 21st Century.



Image 4: Ventilation system fits in the closet (Photo credit: Joe Gransee-Bowman).

Renewable Energy Careers and Networking

MRES Host Green Drinks

MRES hosts Green Drinks at:
Heartland Restaurant's Wine Bar
www.heartlandrestaurant.com
1806 Saint Clair Ave / St Paul, MN 55105



Host Group:
Minnesota Renewable Energy Society (MRES)
Contact: Laura Cina <LauraC@mnRenewables.org>
www.mnRenewables.org

St. Clair & Fairview, St. Paul. Street parking, or consider TAKING THE BUS!

Dates:

October 14 / 6-7:30ish

Rebecca Lundberg from Powerfully Green will discuss solar electricity. How it works, what homes it works on and which ones it doesn't and the different PV technologies. Solar Panel vs Thin Film? Are there really Solar Shingles?

November 11 / 6-7:30ish

Speaker or theme to be announced.

December 9 / 6-7:30ish

Solar in the Third World! We will discuss the benefits of Solar Energy in Third World countries, how it's a benefit and what we can do to help. Linda Cullen Weiley will be there to discuss her non-profit, Fifty Lanterns.

January 13, 2010 / 6-7:30ish

Loren Abraham of Abraham + Associates Architects will discuss the basics of passive solar and how it can be implemented in a home in order to use less energy and Joe Gransee Bowman will discuss the Passive House design approach that is being used in Europe to create ultra efficient homes.

TC Green Drinks: <http://greendrinks.org/index.php?region=USA&city=Minneapolis/St.%20Paul>

The Twin Cities Green Drinks (TCGD) is part of a global non-movement to charge your eco spirit, make some new connections, and learn a thing or two. All of our haunts offer a variety of organic food and beverages for ALL ages. Green-Drinkers from other cities are always welcome!

Join MRES on FaceBook and LinkedIN



Just click on these buttons to be our Facebook Friend and join our LinkedIn Group.

Rent Solar Cart



Rent portable solar power @ \$50

Rent Solar PathFinder



Solar PathFinder - \$25 rental to MRES members

Rent Solar Trailer

[IPS Solar](#) and MRES have joined efforts to build the most versatile power supply in the state. The Solar Power Trailer is both an educational tool and a fully functioning power source that can provide quiet, clean, renewable solar power to any site. Use it for remote power at family reunions, picnics, church, or school events. [Minnesota MPCA](#) donated the PV panels to upgrade the Solar Trailer to 1.664 Kw, and [Mario Monesterio of Westwood Renewables](#) donated the labor to install the recent upgrade with the new PV panels.

Examples of What the Trailer Can Power:

- A concert for 5,000 people
- A small carnival
- Up to 25 trade show booths
- Temporary telecom sites
- About 5 concession stands
- About 200 laptop computers

Trailer Specifications:

- PV array rating 1664 watts (newly upgraded)
- 2 Trace SW4024 inverters (4 Kw at 48 volts)
- Battery bank rating 440 amp-hours = 21,120 Kwh
- 40 amp max at 110 vAC capacity
- Usable total battery capacity: 16,896 Kwh
- 10-volt 30-amp circuit breaker for larger concert equipment
- Approximate trailer weight: 3,000 pounds



Solar Trailer

To [rent the solar trailer](#), solar cart, or solar pathfinder - contact David Boyce at (651) 324-1642 or DavidB@mnRenewables.org

Copyright © 2009
All Rights Reserved.
For material use permission, please contact us:
Minnesota Renewable Energy Society
2928 5th Avenue South, Minneapolis, MN 55408
(612) 308-4757



www.mnRenewables.org

MRES Solar Flare
Editor: Jan Hubbard
Associate Editor: Doug Shoemaker
For comments, suggestions, or
story submissions, contact:
JanH@mnRenewables.org or
DougS@mnRenewables.org